Amendments to the Claims

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. (Currently amended) Apparatus for extracting a substance from a liquid sample comprising:

(a) a container having an entrance, an exit, and a passage therebetween for passage of a liquid sample containing a substance to be extracted therethrough, the passage comprising a sidewall, wherein the exit is substantially centrally located in a bottom wall of the container, the bottom wall having a substantially flat internal surface;

(b) within the passage, a thin layer of microparticulate extraction media for extracting the substance from the liquid sample, wherein:

(i) the extraction media layer has a top surface, a bottom surface, and a peripheral edge,

(ii) the extraction media has a particle size of less than 20 microns,

(iii) the ratio of the effective diameter of the extraction media layer to the distance between its top and bottom surfaces is at least 5, and

(iv) the extraction media layer is oriented in the passage so that liquid flows through the extraction media layer from its top surface to the bottom surface; and

(c) an upper compression layer at the top surface of the extraction media layer and a lower compression layer at the bottom surface of the extraction media layer, the two compression layers pressing the extraction media therebetween, the compression layers being sufficiently porous that the liquid sample flows therethrough, the compression layers being formed of a flexible, hydrophilic microfiber material and having a pore size less than the particle size of the extraction media.

2. (Original) The apparatus of claim 1 wherein the apparatus is made of materials substantially inert to biological fluids so that when blood or urine is passed through the apparatus, substantially nothing passes from the apparatus into the blood or urine.

3. (Original) The apparatus of claim 1 wherein the distance between the top and bottom surfaces of the layer of extraction media is less than 1 mm.

4. (Currently amended) The apparatus of claim 3 wherein the ~~the~~ distance between the top and bottom surfaces of the layer of extraction media is from 0.2 to 0.9 mm.

5. (Original) The apparatus of claim 1 wherein the compression layers are formed of the same material.

6. (Original) The apparatus of claim 1 including an upper mesh flow distributor above the upper compression layer for distributing flow of the liquid sample uniformly to the extraction media layer top surface.

7. (Previously presented) The apparatus of claim 6 wherein the upper mesh flow distributor holds the compression layers and the extraction media layer in the container.

8. (Original) The apparatus of claim 1 including a lower mesh flow distributor below the lower compression layer.

Claims 9 and 10 (canceled).

11. (Currently amended) The apparatus of claim 1 wherein the ~~container includes an inner wall~~ sidewall is in contact with the peripheral edge of the media layer.

12. (Previously presented) Apparatus for extracting an analyte from a liquid sample comprising:

(a) a microcolumn having an entrance, an opposed exit, and a passage for passage of the liquid sample downwardly therethrough;

(b) within the passage, a thin layer of microparticulate silica extraction media for the analyte, wherein:

(i) the extraction media layer has a top surface, a bottom surface, and a peripheral edge,

(ii) the extraction media has a particle size of less than 20 microns,

(iii) the ratio of the effective diameter of the extraction media layer to the thickness of the extraction media layer is at least 5, and

(iv) the extraction media layer is oriented in the passage so that liquid flows through the layer from its top surface to the bottom surface;

(c) an upper compression layer at the top surface of the extraction media layer and a lower compression layer at the bottom surface of the extraction media layer, the compression layers pressing the silica extraction media therebetween, the compression layers being sufficiently porous that the liquid sample flows therethrough, the compression layers being formed of a flexible, hydrophilic, glass fiber and having a pore size less than the particle size of the silica extraction media;

(d) an upper mesh flow distributor above the upper compression layer for distributing flow of the liquid sample uniformly to the extraction media layer top surface; and

(e) a lower mesh flow distributor below the lower compression layer.

13. (Original) The apparatus of claim 12 wherein the pore size of the compression layer is less than 5 microns.

14. (Original) The apparatus of claim 12 wherein the microcolumn has a bottom with the exit being through the bottom, the bottom having an internal wall, the internal wall being substantially flat.

15. (Original) The apparatus of claim 14 wherein the exit is substantially centrally located in the bottom.

16. (Previously presented) Apparatus for extracting an analyte from a liquid sample comprising:

(a) a microcolumn having an entrance, an opposed exit, an inner peripheral wall, a substantially flat inner bottom wall, and a central bore therethrough for passage of a liquid sample containing an analyte therethrough, the exit being substantially centrally located in the bottom wall;

(b) within the bore, a thin layer of microparticulate silica extraction media adapted for extracting the analyte from the liquid sample, the extraction media having a particle size of less than 20 microns, the extraction media having a top surface facing the entrance and a bottom surface facing the exit, the ratio of the diameter of the extraction media layer to the thickness of the layer being at least 10, the inner wall of the microcolumn being in contact with the peripheral edge of the extraction media layer;

(c) an upper compression layer and a lower compression layer pressing the silica extraction media therebetween, the compression layers being sufficiently porous that the liquid sample flows therethrough and into the extraction media layer top surface and out

of the extraction media layer bottom surface, the compression layers being formed of a flexible, hydrophilic, substantially binder free glass fiber and having a pore size less than the particle size of the silica extraction media; and

(d) an upper mesh flow distributor above the upper compression layer and a lower mesh flow distributor below the lower compression layer sandwiching the compression layers and the layer of extraction media therebetween, the flow distributors holding the extraction media and the compression layers in the microcolumn, the upper mesh flow distributor distributing liquid sample uniformly across the top surface of the extraction media layer.

17. (Previously presented) Apparatus for extracting an analyte from a liquid sample comprising:

(a) a container having an entrance, an exit, and a passage therebetween for passage of a liquid sample containing an analyte therethrough, the container having a substantially flat bottom wall with the exit substantially centrally located therein;

(b) within the passage, a thin layer of microparticulate extraction media for extracting the analyte from the liquid sample, wherein;

(i) the extraction media layer has a top surface, a bottom surface, and a peripheral edge,

(ii) the extraction media has a particle size of less than 20 microns,

(iii) the distance between the top and bottom surfaces of the extraction media layer is less than 1 mm, and

(iv) the extraction media layer is oriented in the passage so that liquid flows through the layer from its top surface to the bottom surface;

(c) an upper compression layer at the top surface of the extraction media layer and a lower compression layer at the bottom surface of the extraction media layer, the two compression layers pressing the extraction media therebetween, the compression layers being sufficiently porous that the liquid sample can flow therethrough, the compression layers being formed of a flexible, hydrophilic, microfiber material and having a pore size less than the particle size of the extraction media;

(d) an upper mesh flow distributor above the upper compression layer for distributing flow of the liquid sample uniformly to the extraction media layer top surface; and

(e) a lower mesh flow distributor below the lower compression layer.

Claim 18 (canceled).

19. (Previously presented) The apparatus of claim 18 wherein the upper mesh flow distributor holds the compression layers and the extractions media layer in the container.

Claim 20 (canceled).

21. (Original) A method of extracting a substance from a liquid sample comprising the step of passing the liquid sample into the entrance of the apparatus of claim 1 for transverse flow through the extraction media layer and out the exit, wherein the substance is extracted from the liquid sample by the extraction media.

22. (Original) A method of extracting an analyte from a liquid sample comprising the step of passing the liquid sample into the entrance of the apparatus of claim 12 for transverse flow through the extraction media layer and out the exit, wherein the analyte is extracted from the liquid sample by the extraction media.

23. (Original) A method of extracting an analyte from a liquid sample comprising the step of passing the liquid sample into the entrance of the apparatus of claim 16 for transverse flow through the extraction media layer and out the exit, wherein the analyte is extracted from the liquid sample by the extraction media.

24. (Original) A method of extracting an analyte from a liquid sample comprising the step of passing the liquid sample into the entrance of the apparatus of claim 17 for transverse flow through the extraction media layer and out the exit, wherein the analyte is extracted from the liquid sample by the extraction media.

25. (Original) The apparatus of claim 1 wherein the ratio of the effective diameter of the extraction media layer to the distance between its top and bottom surfaces is at least 10.

Claim 26 (canceled).

27. (Currently amended) An apparatus for extracting a substance from a liquid sample comprising:

(a) a container having a top, a bottom, an entrance in the top, an exit in the bottom, and a passage between the entrance and exit for downward passage of a liquid

sample therethrough, the bottom having an inner ~~well~~ wall which is substantially flat with the exit being substantially centrally located in the bottom;

(b) within the passage, a thin layer of microparticulate extraction media for extraction of the substance from the liquid sample, the ratio of the diameter of the extraction media layer to the thickness of the extraction media layer being at least 10; and

(c) a cylindrical support means for the extraction media layer, the support means having a flat upper surface and a flat lower surface, the support means being directly seated against the bottom inner wall and the extraction media layer being directly against the support means,

wherein the support means comprises a lower compression layer at the lower surface of the extraction media layer and a lower mesh flow distributor below the lower compression layer.

28. (Previously presented) The apparatus of claim 27 wherein the support means further comprises an upper compression layer at the upper surface of the extraction media layer and an upper mesh flow distributor above the upper compression layer.

29. (Previously presented) The apparatus of claim 27 wherein the apparatus is made of materials substantially inert to biological fluids, solvents and the substance to be extracted contained therein, so that when the biological fluids, solvents and the substance to be extracted pass through the apparatus, substantially nothing passes from the apparatus into the biological fluids, solvents and the extracted.

30. (Previously presented) The apparatus of claim 27 wherein the layer of extraction media layer has a top surface and a bottom surface, and the distance between the top and bottom surfaces of the layer of extraction media is less than 1 mm.

31. (Previously presented) The apparatus of claim 30 wherein the distance between the top and bottom surfaces of the layer of extraction media is from 0.2 to 0.9 mm.

32. (Previously presented) The apparatus of claim 27 wherein the extraction media layer has a top surface and a bottom surface and the ratio of the effective diameter of the extraction media layer to the distance between its top and bottom surfaces is at least 5.

33. (Previously presented) The apparatus of claim 32 wherein the effective diameter of the extraction media layer to the distance between its top and bottom surfaces is at least 10.

34. (Previously presented) The apparatus of claim 27, wherein the extraction media has a particle size of less than 20 microns.

35. (Previously presented) The apparatus of claim 28 wherein the compression layers are formed of the same material.

36. (Previously presented) The apparatus of claim 28 wherein the upper mesh flow distributor holds the compression layers and the extraction media layer in the container.

37. (Previously presented) The apparatus of claim 28 wherein the pore size of at least one of the upper and lower compression layers is less than 5 microns.

38. (Previously presented) The apparatus of claim 28 wherein at least one of the upper and lower compression layers is formed of a flexible, hydrophilic, substantially binder free glass fiber and having a pore size less than the particle size of the extraction media.

39. (Previously presented) A method of extracting a substance from a liquid sample comprising the step of passing the liquid sample into the entrance of the apparatus of claim 27 for transverse flow through the extraction media layer and out the exit, wherein the substance is extracted from the liquid sample by the extraction media.

40. (Previously presented) The method according to claim 39 wherein the substance is an analyte and the method comprises extracting the analyte from the liquid sample by passing the liquid sample into the entrance of the apparatus for transverse flow through the extraction media layer and out the exit, and wherein the analyte is extracted from the liquid sample by the extraction media.

41. (New) The apparatus of claim 1, wherein the bottom wall is substantially perpendicular to a flow path between the entrance and the exit.